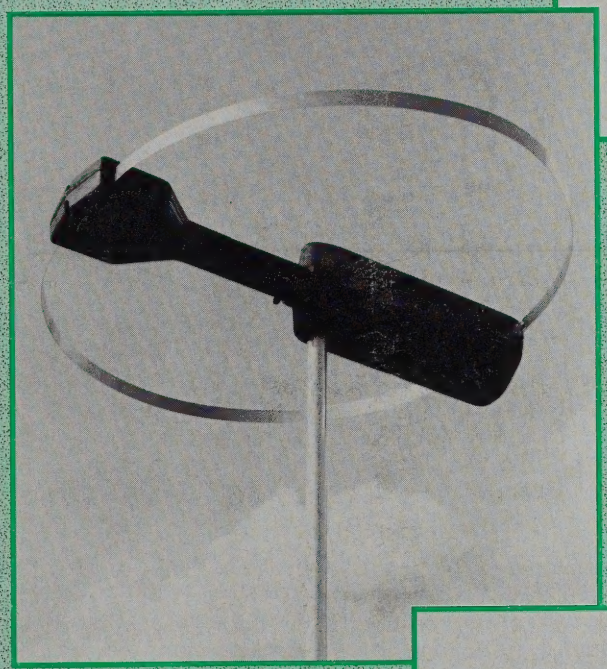
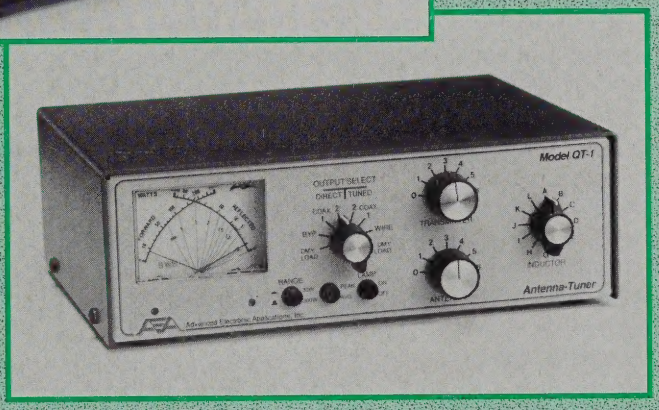
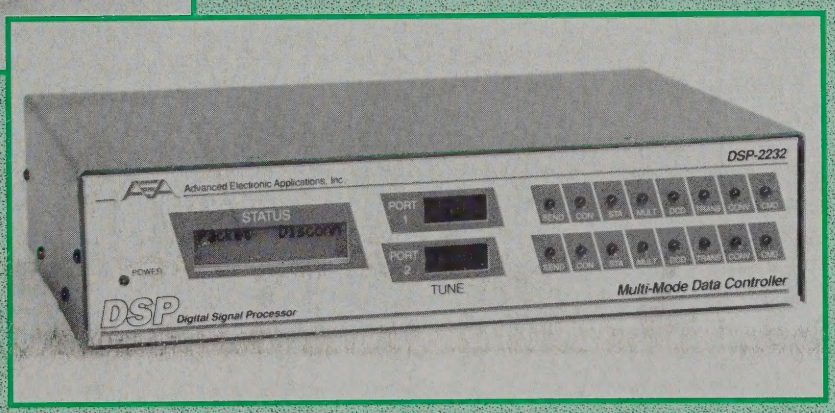
1991 Catalog







Advanced Electronic Applications, Inc.

2006-196th St. SW/P.O. Box C2160 Lynnwood, WA 98036

(206)775-7373

Antennas

NEW

IsoLoop™ model 10-30 HF Antenna

Once again AEA has achieved a significant engineering breakthrough with its redesigned high-performance, low profile HF IsoLoop model 10-30 antenna. Performance isn't compromised by its small size. Operate your favorite HF band (10 to 30 MHz continuous) from areas with restrictive zoning ordinances or apartments and condos. Or take it with you on vacation... it's the ideal go-anywhere portable antenna. ONE antenna instead of numerous dipoles, unsightly verticals, antenna tuners or ground radials. The IsoLoop model 10-30 is also ideal for filling in the new WARC bands your current antenna may not tune to (such as 12 and 17 meters). The IsoLoop makes the PERFECT Standby portable antenna!

Rated up to 150 watts, the IsoLoop model 10-30 transmits and receives on any frequency between 10 and 30 MHz.

Innovative design. The IsoLoop concept was first born over five years ago, and AEA has been perfecting the design ever since. The IsoLoop model 10-30 represents the latest hi-tech, weather-and corrosion-resistant low-profile design. The IsoLoop model 10-30 has no mechanical joints, so the possibility of corrosion is kept to a minimum. We'll even back that up with a five-year no-corrosion guarantee!

Omnidirectional. When mounted with the loop in the horizontal plane, the radiation pattern is omni-directional and horizontally polarized, with gain similar to a dipole. Maximum radiation is at low angles which is ideal for DX operation.

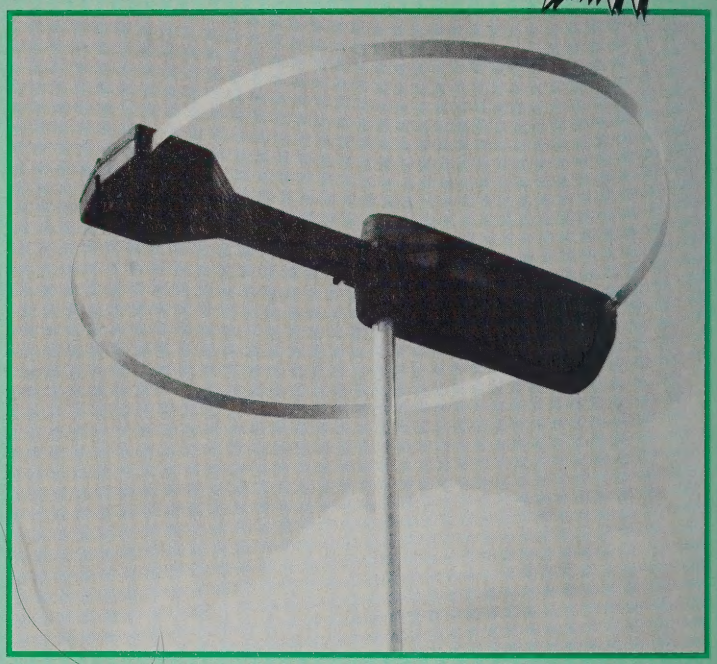
The IsoLoop may also be mounted with the loop in the vertical plane to provide a null in a desired direction.

Easy Tuning. Tuning is provided by a direct-drive (no belts) precision stepper-motor and a small remote control box, the LC-2 (supplied with 50ft control cable). Signal strength LEDs on the LC-2 make tuning a snap. An optional frequency indicator provides information to make tuning even easier.

Fully Assembled. The IsoLoop model 10-30 comes fully assembled from the factory. To get on the air, you simply slide the loop on the mast (not included), tighten down the U-bolt and attach the coax. That's it! No complicated instructions and no mechanical joints.

No additonal tuner or antenna rotor is required. With only a simple mast required for mounting, the IsoLoop makes a very cost effective antenna system.

The IsoLoop is isolated from the feedline (hence its name) at radio frequencies which keeps the feedline from becoming part of the radiating structure. This provides an undistorted radiation pattern and less stray RF in the ham shack. The IsoLoop is also much more effective at very low elevations than dipoles. This antenna also makes



the ideal marine antenna with **no** ground plane or expensive automatic tuner required.

Efficient High-Q design. One of the unique features of the IsoLoop is its inherent High-Q. The IsoLoop can be considered a very sharp tunable filter that radiates. The narrow bandwidth suppresses harmonics from your transmitter, reducing TVI problems. It also attenuates out-of-band signals from nearby transmitters that could overload your receiver. No mechanical joints means minimal IR losses and better reception.

Compact. The IsoLoop model 10-30 is round, measuring 43 inches in diameter and weighing only 14 pounds. And because it comes fully assembled, it is ideal for Field Day, DXpeditioning, etc.

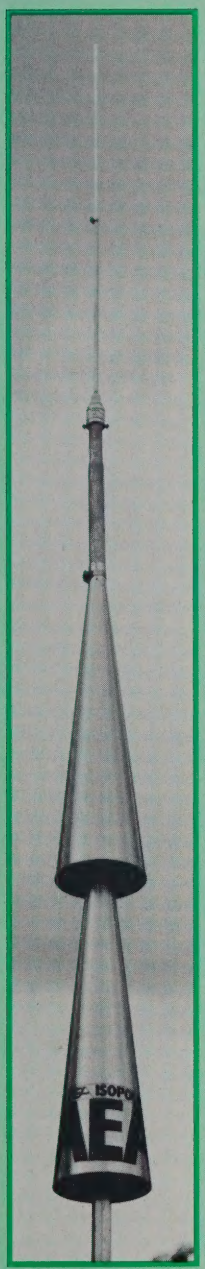
Patents Pending.

Specifications

Frequency Coverage:	10 to 30 MHz
Nominal Impedance:	50 ohms
Power Rating:	150 watts
VSWR:	Less than 1.5:1 (no nearby obstructions)
Temperature Range:	Operating 0 to 150 degrees F Storage -50 to 200 degrees F
Dimensions:	43"(109cm) diameter circle
Maximum Mast Outside Diameter:	2"(51mm)
Shipping Weight:	14 lbs.(5.5kg) UPS shippable
Coax Connecter:	UHF (SO-239)
Gain over dipole:	Depends on elevation

Mast and coax cable not included. Optional LC-2 shielded control cable with connectors available in 100ft length.

Antennas



IsoPole™ Omni-Directional VHF/UHF Vertical Antennas

The only logical choice for a cost and space efficient base station antenna is AEA's IsoPole.™

Available in 144, 220 or 440 MHz, all IsoPole antennas yield the maximum gain attainable for their respective lengths, and a zero-degree angle of radiation. Exceptional decoupling results in simple tuning and a significant reduction in TVI potential. There is less feedline pickup of computer hash noise with the IsoPole than **any** equivalent antenna. Cones offer greater efficiency over obsolete radials which radiate in the horizontal plane. Plus the IsoPoles have a broad frequency coverage. This means no loss of power output from one end of the band to the other, when used with SWR-protected solid-state transceivers. Experience a typical SWR of 1.4 to 1 or better across the entire band!

VHF versions include a 50 ohm SO-239 connecter recessed within the base sleeve for full weather protection. With the IsoPole you won't experience the aggravating deviation in SWR when the weather changes. Also, the impedance matching network is designed for maximum legal power and compensates for the impedance lump introduced by the SO-239 connector used in the VHF models.

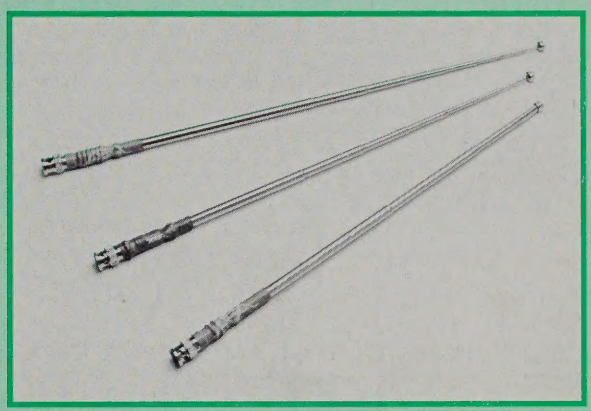
AEA's IsoPoles are built to withstand the environment. The insulating material offers superb strength and dielectric properties plus excellent long-term ultra-violet resistance. Mounting hardware is stainless steel. The decoupling cones and radiating elements are made of corrosion resistant aluminum alloys. The aerodynamic cones are the only appreciable windload and are attached directly to your TV mast (mast not supplied).

IsoPole Specifications

Model	144	220	440
Frequency Coverage:	135-160 MHz	210-230 MHz	415-465 MHz
Impedance:	50 ohms	50 ohms	50 ohms
2.1 VSWR Bandwidth:	10 MHz @146 MHz	15 MHz @220 MHz	22 MHz @435 MHz
Power Rating:	1.0 kW	1.0 kW	1.0 kW
Length:	125.5"(3.2m)	79.25"(2m)	46"(1.2m)
Wind Area:	< 1 ft^2	< .75 ft^2	< 0.2 ft^2
Maximum Mast OD:	1.25"(32mm)	1.25"(32mm)	1.25"(32mm)
Min. Mast Length*:	8.0'(2.4m)	5.25'(1.6m)	6"(50mm)
Coax Connector:	SO-239	SO-239	Type N
Gain (on horizon):	3dBd	3dBd	3dBd

*Mast not included.

Hot Rod™ Telescoping Antennas



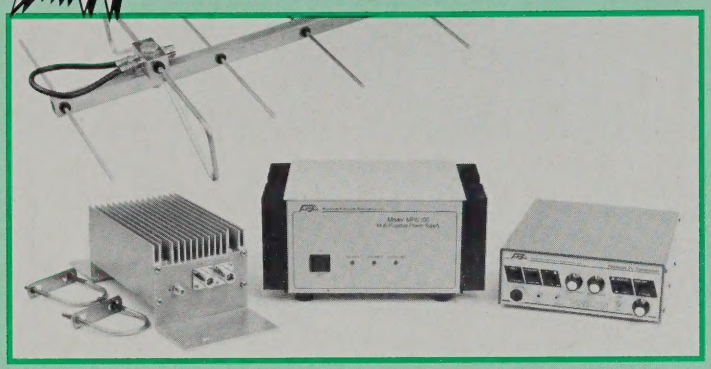
AEA's high-performance telescoping handheld antennas provide maximum gain and extended range. The Hot Rod antennas make the same improvement to handheld communications that the IsoPole antennas make to base station operation. Achieve higher gain than ANY 5/8 wave two-meter telescopic antenna for handhelds. The HR-1 is 20% shorter and lighter, placing less stress on your handheld connector and case. It will handle over 25 watts of power, making it an excellent portable base or mobile antenna. In the collapsed position, the Hot Rod antenna will perform electrically like a helical quarter-wave flexible antenna.

Three versions are available:

- HR-1 half-wave 2M
- HR-2 half-wave 220 MHz
- HR-4 half-wave 440 MHz

NEW

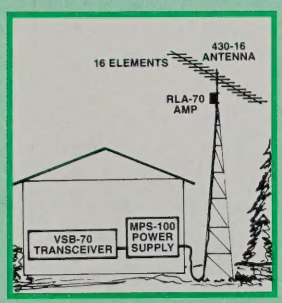
Amateur TV



VSB-70 Fast-Scan Transceiver

Vestigial Sideband remains the best way to send Fast-Scan Television signals. It's the **only** type of modulation used by commercial television stations. It preserves precious spectrum space, minimizes adjacent channel interference and is unbeatable for overall picture and sound quality.

Only AEA offers VSB technology to Amateur Television operators with the new VSB-70 transceiver. The complex circuitry is more costly to manufacture than double sideband television transceivers, but top-of-the-line quality is what hams have come to expect from AEA. The redesigned circuit has kept production costs to a minimum, so superior Amateur Television is now more affordable than ever.



The VSB-70 Transceiver features a low-noise UHF GaAsFET preamp with a typical system noise figure of less than 1.5dB and a crystal-controlled or variable tuning down converter. Output is available on channel 3 or 4 for signal reception AND monitoring transmissions. Two frequencies can be selected from the front panel for transceive. The AEA design is also optimized for superior video and audio quality without sync buzz even with weak signals. The VSB-70 is the only transceiver you need to work ATV and it also allows you to use your TV set to monitor your transmitted **and** received pictures.

If you've been putting off getting into amateur television for any reason, now is the time to act! There has never been a better value in amateur television transceivers. The VSB-70 is easy to hook up and easy to use, and with our exclusive VSB technology offers unmatched picture and sound quality. All backed up by AEA's reputation for quality and service. There is still time to experience the thrill of being a pioneer on this mode.

Specifications (Typical)

TRANSMITTER

Frequency Range:	420 to 440 MHz
Operational Frequencies:	434 MHz and 439.25 MHz supplied (CH 3); 421.25 MHz and 426.25 MHz optional
Power Output:	1 watt P.E.P. on sync peaks
Modulation:	Vestigial sideband video, FM audio
Intermodulation Distortion:	Less than -42 dBc
Harmonic:	Less than -40 dBc
Power Requirement:	13.6 ±0.5 VDC, 1.5 A plus camera current
Protocol:	NTSC only

RECEIVER

Conversion gain:	More than 25 dB
Noise Figure:	Less than 1.5 dB
Power Requirement:	13.6 ±0.5 VDC
Impedance:	50 ohms nominal

PHYSICAL

Front Panel Controls:	Video/camera, camera on/off, F1/F2, receive/transmit, power on/off, video gain, audio gain, Rx tune, camera 10-pin connector, microphone and PTT input jacks
Rear Panel Connectors:	Power, antenna and TV coax connectors, audio in and video in jacks
Dimensions:	7.4"(188mm)W x 8.3"(211mm)D x 2.6"(66mm)H
Weight:	2.2lbs.(.99kg)

ATV Accessories

The RLA-70 Amplifier with Power Supply gives a boost to your ATV signal while preserving the characteristics of VSB. The 50W P.E.P. mast-mounted Linear Amplifier (patent pending) covers 420 to 450 MHz and utiliizes the feedline for DC power. The GaAsFET receive preamp is also built-in to the mast-mount assembly and includes all necessary relay circuitry. Mast mounting eliminates the line loss between the amplifier/preamplifier and the antenna to improve both transmission and reception, and is the equivalent of a 100W amplifier in the shack with a 3dB line loss. The amplifier is housed in a weather-resistant alodined aluminum case. The MPS-100 power supply comes with the amplifier and provides 28 VDC for the amplifier plus a 13.8 volt output for the VSB-70.

Specifications

RLA-70 Amplifier

Frequency Range:	420 to 450 MHz
Power Output:	50 watts PEP minimum on sync peaks
Mode:	Linear, Class AB
Gain:	20 dB min at 0.5W input
Inter-Mod. Distortion:	LSB audio subcarrier -20 dBc,typically -30 dBc
Power Input (RF):	0.5 watt max for 50 watts out
Power Input (DC):	28 VDC at 4-5 amps (supplied by the MPS-100 power module)
Connectors:	Antenna: Type N
Input:	Type N (Both drive and DC power are supplied by the feedline)
PTT:	Type F
TR Switching:	RF sensing and/or contact closure (PTT)

Preamplifier

Gain:	10 dB typical
Noise Figure:	1.5 dB typical
Device:	Motoroloa MRF 966 GaAsFET

MPS-100 Power Supply

Line input:	120 VAC nominal (60 or 50 Hz)
RF Input:	BNC connector for 70 cm input
Outputs:	Adj. 28 to 30 VDC @ 6 amps max on N connector. 13.8 VDC @ 2 amps for ATV xcvr on coaxial power connector
Controls:	AC power switch Coax length adjust (28 Volt output adjust)
Fuse:	2 amp slow-blow
Indicators:	AC Power, Transmit and Overload LEDs

The 430-16 Antenna is a high-performance, computer-optimized yagi specifically designed for ATV operation. It features broadband frequency coverage from 420 to 440 MHz, 14.3 dBd gain, O-ring sealed connectors, 28 degree E-plane and 32 degree H-plane beam width and 16 elements on a 10-foot boom.

Specifications

430-16 Antenna

Frequency:	420 to 440 MHz
Gain over a dipole:	14.3 dB
Feed impedance:	50 ohms nominal
VSWR:	1.3:1 or better
Driven element type:	Butterfly dipole
Balun:	4:1 coaxial halfwave
Power handling:	250 watts
Stacking distance:	48 to 52 inches
Wind load:	0.82 square feet
Weight:	4 lbs.

Now available to ham clubs, AEA's ATV videotape, "Seeing is Believing." Contact AEA for more information.

Slow Scan

AEA's AVT Master SSTV and FAX System

Imagine sending and receiving high resolution color or black and white images and photos via radio transceiver OR telephone. And then imagine the ability to "erase" QRM and noise effects. With AEA's new AVT (Amiga Video Terminal) Master System, you get pixel perfect pictures. The AVT Master offers 55 SSTV (Slow-Scan TV) modes, many in up to 4,096 simultaneous colors with a resolution from 128 by 120 up to 640 by 400. Nine FAX modes in resolutions up to 1,024 pixels by 1,200 lines in 16 grey levels is also possible. The AVT offers every known SSTV commercial and experimental mode, as well as WEFAX, NEWSFAX and GOES FAX (with optional board from Overview Systems*). This is a major breakthrough for SSTV and FAX enthusiasts!

Flexible Hardware. Five software selectable receiver inputs allow you to attach a two-meter, six-meter, HF and SWL rig plus a tape recorder...all at the same time! Plus there's an RJ-11 telephone jack. Simply plug in your phone to the interface unit and transmit a full-color image in less than 12 seconds. Both positive and negative transmitter keying, as well as individual tape recorder and transmitter audio outputs provide the ultimate connection. You don't ever need to touch the box...all controls, including system audio output levels and input selection, are accomplished on-screen using the Amiga mouse.

High Performance. The AVT is gaining popularity every day, passing picture-perfect images over many parts of the world. Images sent with the AVT may be damaged as much as 50 percent by QRM and QRN, and still be recovered by the system so that it's almost impossible to tell there was ever any interference. Built-in image processing and signal conditioning ensures the best picture quality, picture after picture.

AVT image before transmission.

Compatibility. You can copy ANY SSTV or FAX signal that you receive... the AVT supports all modes, from the new European modes to the older color composites to black and white SSTV to 60/120/240 LPM FAX transmissions. Multiple aspect ratios provide the right picture when monitoring those unusual FAX stations, too. All of these modes are available in full transceive. The images received by the system are compatible with every paint program, digitizer, frame grabber and scanner currently known for the Commodore Amiga, allowing unparalleled flexibility and artistic freedom.

Revolutionary. The AVT also offers new SSTV formats that easily outperform ALL pre-existing modes...integral data recovery, narrow bandwidth, full color, multi-image (3-D), multiple resolution and synchronous transmission.

Intuitive. Every command is presented in a logical, consistent series of menus and control panels. Sophisticated tools such as a detailed oscilloscope simulator aids tuning. The system even transmits an "Alignment Signal" to ensure a quick match in frequency between systems when operating SSB.

Feature-Packed. Built-in capabilities include: Tuning oscilloscope. Mode-to-mode conversions. Interpolating zoom. Image inset. Brush "Clipart" (file artwork) cut and paste, including transparent background. Image tinting, brightness and contrast control. Thresholding. Black-and-white and color histograms. Text overlay using multiple fonts, boldface, italics and underlining in any combination or color. Automatic CW and synthesized speech ID after transmit. Extensive macro and script capability. Custom color bar generation. Luma conversion and image averaging. Black-and-white and color negatives. Eight function "repair kit" for damaged scan lines. Intelligent multiple mode full-frame image cleanup with sensitivity control. Owner defined FAX demodulation curves. Image rotation and flipping. Paint capability. Extensive ARexx language support. Real-time software filtering for scope and receive operations. Up to 16 high-resolution image memories at one time. Grab screens to transmit from any digitizer or operating program in real-time. Transmit and receive sequences of images using multiple memories. One button automatic reception of most SSTV modes. Automatic start and run at any time... catch those midnight FAXes without being there (with ARexx program). Copy and exchange between image memories. On-screen DTMF pad. Image printing in both black-and-white and color on literally hundreds of different printers. You can even tell the system what to do remotely (with ARexx program), via packet and/or RTTY using standard TNCs such as AEA's high performance PK-232/MBX multi-mode data controller.

Image in process of being restored after heavy QRM transmission.

Updates. Since the AVT is a software driven system, there aren't any costly ROM and hardware updates. Occasional updates will be provided on a disk. Simple, inexpensive and fast.

Inexpensive. The good news is that you can purchase the AVT and an Amiga computer system for less than a self-contained SSTV system costs! If you already own the computer (minimum of 1.5 megabyte of memory required), you already own the most expensive components of your SSTV System!

* Contact Tim Heffield at (305) 748-8315

Keyer-Trainer

Simply the world's BEST electronic Morse keyer ever offered!

The Morse Machine™

The Morse Machine has all the features you need in a memory keyer, including 2-255 WPM speed selection and over 8,000 characters of memory that can be stored in 20 soft-partitioned memories. Memory can be expanded up to 36,000 characters, and all memory is backed up by an internal lithium battery so that once a message is loaded, it will stay there until you delete it or write another message over it.

Whether you're an expert or a novice, The Morse Machine has three ways to help you improve your code:

- A proficiency trainer allows random code group practice with steadily increasing speed
- Random word generator that randomly generates four-letter words for a more realistic practice session
- QSO simulator based on AEA's program for the Commodore 64 computer. You can call and work simulated stations, answer a CQ or just sit back and listen to realistic QSOs very much like those you would hear on the air
- DX Contest Simulator based on AEA's program for the Commodore 64 computer. You can participate in a realistic DX contest or just listen in.

Full Featured. The Morse Machine is a full-featured keyer for the serious contester, with automatic serial number insertion and incrementing in any memory message. One memory may be used as a repeating CQ. You can use the front panel knob to adjust your sending speed or enter a precise speed with the keypad, toggling between the two at any time. Exchanges can be speeded up by having parts of your message sent at a higher speed. You can also add remote switches for four of the memories so you can instantly send your responses or call CQ.

Computer Compatible. A computer can be interfaced to The Morse Machine through its RS-232 compatible I/O. Any front panel keypad function may be programmed by the computer. This makes loading memories as simple as typing them in from your keyboard. The MM-3 can display your random code, QSO or DX contest practice sessions or the your contest score on the computer screen.

Automatic Beacon. AEA's MM-3 can also be programmed to be an automatic beacon. This can be used to automatically repeat a Morse (or RS-232 ASCII) message at a programmed interval of one to 999 seconds.

Customization. The Morse Machine's keypad offers an intuitive, easy-to-use method of quickly changing parameters to customize the MM-3 to meet your specific needs. Most commands are clearly labeled on the front panel so the manual is rarely necessary for normal operation.

Specifications

Speed Range: 2 to 99 (variable) or 2 to 255 (programmable) WPM (Front Panel Pot or Keypad)
Memory: 8,192 bytes (approx. 8,400 characters)
Memory Option: 32,768 bytes (approx. 36,000 characters)
Keying Output: +50 V, 500 mA max.; -35 V, 30 mA max.
Computer I/O: 150 to 9600 baud, RS-232 compatible
Serial Numbers: 1 to 9,999
Beacon Interval Range: 1 to 999 seconds
Increase Speed Time: 0.1 to 59.9 minutes
Dot-Dash Memory On/Off: Program selectable
Dot-Space Ratio: Programmable from 0.5 to 1.5
Dash-Space Ratio: Programmable from 2.0 to 4.0
Semi-Automatic (Bug) Mode: Program selectable
Power Requirement: 9 to 16 VDC at 200 mA
Dimensions: 7.4"(188mm)W x 4.75"(121mm)D x 1.9"(48mm)H
Weight: 1.4 lbs.(0.64 kg)

RF Accessories

HPF-1 High Pass Filter

Suppress television interference with AEA's new HPF-1 high pass filter, for 75 **or** 300 ohm TV input impedance.

- Use between TV antenna and VCR or TV
- Reduces signals received from transmitters operating below 30 MHz
- Low loss in the TV passband 52 to 550 MHz
- Unique shield-breaking circuit configuration to prevent antenna cable from acting like an HF antenna
- VSWR less than 1.5:1

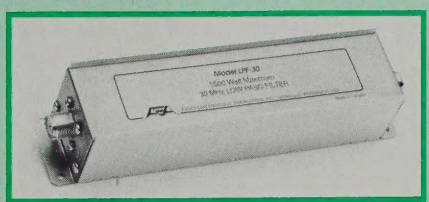
Specifications

Passband:	52-550 MHz
Cutoff Frequency:	50 MHz
Attenuation:	-60 dB at 10 MHz; -55 dB at 20 MHz; -40 dB at 30 MHz
Impedance:	75 ohms unbalanced **or** 300 ohms balanced
Insertion Loss:	Less than 0.5 dB @ 52-550 MHz
VSWR:	Less than 1.5:1
Connectors:	CATV (Type F)75 ohms, spade connectors for 300 ohms

LPF-30 Low Pass Filter

Suppress television interference at the source with AEA's new 1500 watt 30 MHz low pass filter.

- Use between transmitter and antenna or tuner
- Reduces television interference (TVI) radiated by transmitters operating below 30 MHz
- Suppresses harmonics appearing in the TV bands



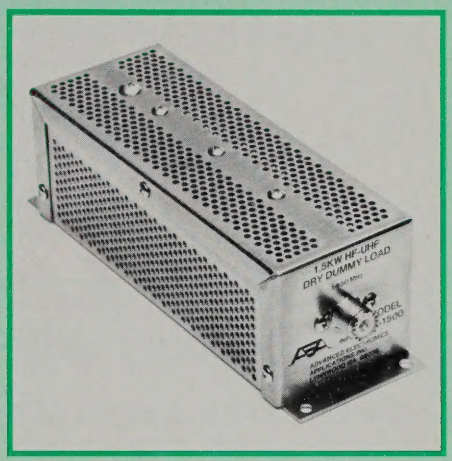
- Additional attenuation to TV IF frequencies above 40 MHz
- Low loss to 30 MHz, VSWR less than 1.3:1
- Nine-pole inverse Chebyshev design

Specifications

Passband:	0-30 MHz
Cutoff Frequency:	35 MHz
Attenuation:	42.17 MHz (color IF), -70 dB; 45.75 MHz (video IF), -70 dB; 55.25 MHz (channel 2 video), -70 dB; Worst case at 65 MHz, -60 dB
Power Capacity:	1500 W
Impedance:	52 ohms
Insertion Loss:	0.25 dB maximum @ 30 MHz
VSWR:	Less than 1.5:1

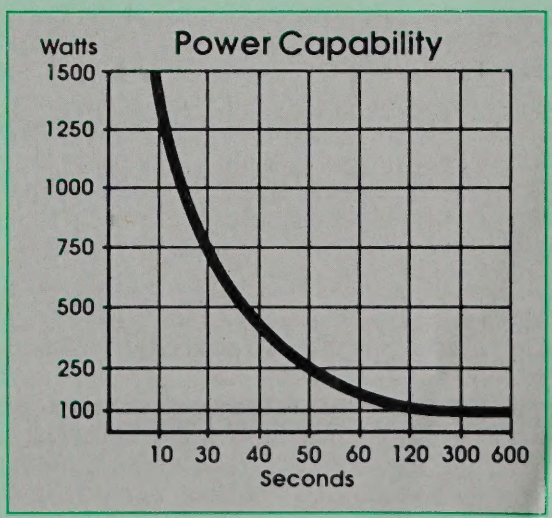
DL-1500 Dummy Load

DC-650 MHz Up to 1500 Watts

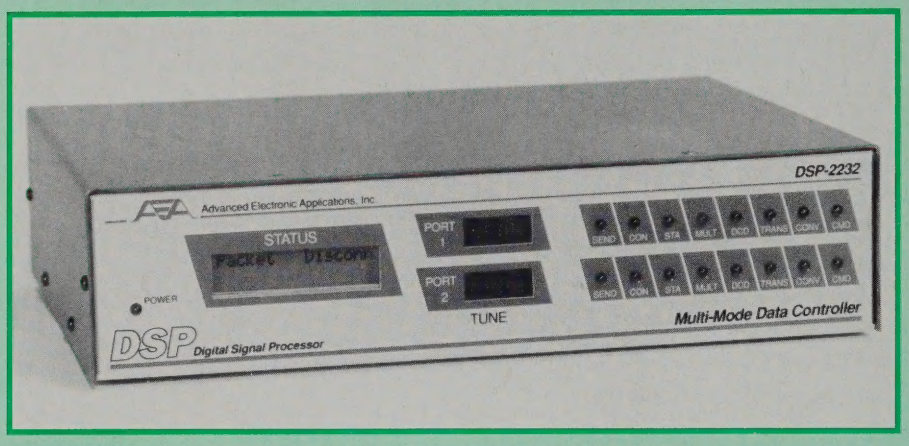


AEA's dry dummy load simulates a perfect 50 ohm antenna up to 650 MHz so you can test your transmitter without radiating a signal on the air.

- DC-650 MHz
- Simulates matched 50 ohm antenna to test your transmitter
- Handles short-term RF power up to 1500 watts
- VSWR of less than 1.3:1 at 650 MHz
- Compact and lightweight
- Air cooled dry load



DSP



DSP-1232 and DSP-2232

Multi-Mode Data Controllers

Utilizing the latest DSP (Digital Signal Processing) technology, AEA announces a major breakthrough in multi-mode data controllers...the DSP-1232 (two switchable ports) and DSP-2232 (two simultaneous ports). From the company that introduced the first multi-mode data controller with Packet and FAX (the PK- 232), this is the next generation to blast you into the future. This is what you've been waiting for, the most advanced and adaptable data controller on the market. Its capabilities are limited only by your imagination.

All Modes. Both the 1232 and 2232 have the hardware included for all available Amateur data modes now. As new modes become available, all that is required is a replacement EPROM or a telephone-BBS downloaded binary file. Available now are all of the PK-232 modems (including the V.26b 2400 bit per second modem), plus the PACSAT, OSCAR 13 and OSCAR 15 satellite modems and the K9NG and G3RUH 9600 bit per second modems. Coming soon are multilevel grey scale WEFAX and WEFAX APT as well as SSTV. Any desired FSK tone pair can be programmed for the DSP units as well as QAM and QPSK or other specialized modems, which makes these DSP modem multi- mode data controllers the most versatile available.

What is DSP? Digital Signal Processing (DSP) provides a new level of performance and versatility. The input analog signal is digitized by a 12-bit high-speed analog-to-digital converter. The digitized data is then processed by a very fast specialized computer (the Motorola 56001 running at 24 MHz) to digitally filter and analyze the data signals. The processed, demodulated signals are then passed to a second processor (Zilog 64180) for protocol conversion. The advantage of DSP is its versatility, as new modems or modes only require new software. No new hardware or modifications are required for new modes.

LCD Read-out. A unique LCD read-out on the DSP-2232 displays the mode and diagnostics for both channels.

Upgradeable. The DSP-1232 can be upgraded to include all of the features of the DSP-2232, if you decide that you want the additional features at a later date.

Includes PK-232 Features. The DSP controllers include all of the outstanding features of the PK-232MBX data controller including the latest version of PakMail(TM) mailbox with selective control of third-party traffic and bulletin board system (BBS) compatibility so you can automatically forward your messages. Also included is the type of Host Mode preferred by many professional programmers for efficient control of the TNC. In packet, the DSP is also compatible with the TCP/IP networking protocol. This requires the data controller to feature special commands such as KISS, PERSISTENCE and SLOTTIME not found in all controllers.

Additional Features Include:

FAX Printing. Many parallel printers can be connected directly to the DSP or to your computer (with the appropriate application software) to print HF monitored FAX signals. The DSP supports most popular dot matrix graphics printing standards.

Time Division Multiplex. The DSP controllers will decode TDM signals. TDM is a mode that resembles FEC AMTOR and is used in commercial applications. TDM uses one subcarrier but assigns separate data channels to different time slots.

Frequency Domain Multiplex. Another commercial coding scheme the DSP controllers can receive and decode, FDM sends the different data channels over separate subcarriers, each at a different frequency.

Fax

and → to move along the line, ↑ and ↓ to change shades
(PgUp) and (PgDn) to cycle through the four grey scales
(End) to restore default colours, (Del) to reset changes
(F10) to save these colours to disk, (Esc) to leave

NEW

AEA-FAX™

Multi-intensity grey scale hardware and software.

From the company which brought you the first multi-mode data controller with digital fax capabilities, the latest engineering breakthrough in low-cost analog FAX reception is now available. The PK-232 was the first multi-mode controller to handle digital WEFAX images, and it still receives those images as well as ever. The high-performance Chebyshev filter is superior for HF reception of any FSK signals. The ability to receive analog (multi-intensity grey scale) facsimile images has never been added to the PK-232 because of one reason: The PK-232 is a no-compromise data controller. Why reduce the PK-232's performance on, for instance, AMTOR or RTTY just to receive a (marginal at best) grey scale image? The PK-232 built its reputation upon superior digital HF performance, and AEA isn't about to compromise that reputation to include inferior analog performance.

No Compromise. Rather than make the same compromise that other multi-modes have, AEA is introducing AEA-FAX, a stand-alone, multi-intensity grey scale demodulator and display software package for IBM compatible computers which can work with or without a PK-232, and won't affect the other modes at all. On a VGA monitor, up to 16 grey levels are possible, giving you outstanding detail on satellite maps and wire photos. WEFAX and WEFAX APT images can also be received. EGA, CGA and Hercules monochrome adaptors and monitors are supported as well (with fewer "grey" scales).

Hardware. The hardware consists of a small RS-232 connector housing, which contains the circuitry for demodulation. A two-conductor shielded audio cable runs from this assembly to your HF receiver's external speaker output. The connector housing has a female DB-25 connector on one side to interface with your computer's COM 1 or 2 port, and a male DB-25 connector on the other side to "daisy chain" with your PK-232, telephone modem or other external RS-232 device. The software automatically switches the external RS-232 input out of the circuit when AEA-FAX is active, and switches the audio input out of the circuit when AEA-FAX is not being used. No additional COM port is needed for AEA-FAX!

Software. The software (one 3-1/2" and two 5-1/4" disks are included) provides on-screen display of the received images, as well as disk and printer access. You can program AEA-FAX to automatically receive images when you are away from the shack, and it will even automatically detect grey scale, line speed and IOC (Index of Cooperation)! The program will work with or without your mouse and is menu driven for ease of use. Other software features include an on-screen tuning scope display that can remain active even when receiving data to the screen, an automatic screen blank feature to help prolong the life of your montior and versatile color selections for menu and screen colors. Your facsimile images can also be displayed with false color separations (EGA & VGA).

Requirements. To run AEA-FAX, you must have the following:

- IBM Compatible computer (with 640K conventional memory, DOS 2.1.1 or higher, at least one serial port, a floppy disk drive [360K 5-1/4" or 720K 3-1/2"], a Printer [Epson or HP LaserJet Compatible]*, a Mouse [Microsoft compatible]* and a Hard Disk Drive*).
- General Coverage HF Receiver.

(Items marked with a * are optional; that is, they are not required but their use will enhance the operation of AEA-FAX).

Don't Compromise! If you want to receive multi-intensity grey scale FAX images, don't compromise! Don't buy a digital multi-mode with an analog mode built in. AEA-FAX is the right way to do grey-scale fax.

Multi-Mode

PK-232MBX
Multi-Mode Data Controller

With over 50,000 units sold worldwide, the PK-232MBX is the world's leading multi-mode data controller. Combining all amateur data communication modes in one comprehensive unit, the PK-232MBX offers Morse code, Baudot, ASCII, AMTOR/SITOR 476 and 625, HF and VHF Packet, WEFAX receive and transmit, as well as commercial standard NAVTEX automated marine information services. The PK-232MBX provides any RS-232 compatible computer or terminal complete amateur digital operating capabilities. All decoding, signal processing and protocol software is on ROM in the PK-232MBX. Only a simple terminal program is required to interface the PK-232MBX to your computer. The PK-232MBX package includes an RS-232 interface cable that connects the unit directly to the RS-232 port of the computer.

The real strength of the PK-232MBX is its superior design. It's a no-compromise data controller specifically designed for multi-mode operation, not just a packet controller with supplemental firmware. The PK-232MBX is a Z-80A based system and has hardware HDLC using the Zilog 8530 SCC. The internal modem of the PK-232MBX can transceive packet at rates from 45 to 1200 baud, with the option of using an external modem for higher baud rates up to 9600 baud. The PK-232MBX has a no-compromise VHF/HF/CW modem with an eight-pole Chebyshev bandpass filter followed by a limiter-discriminator with automatic threshold correction. This modem can copy shifts from 85 to 1500 Hz in two ranges. Transmitter tones are low distortion sinewave phase continuous AFSK, Bell 202 standard (1200-2200 Hz) for VHF and 2110-2310 (compatible with 170 Hz shift for RTTY) for HF.

The PK-232MBX internal software includes special features such as SIAM™ (Signal Identification and Acquisition Mode). The PK-232MBX automatically identifies Baudot, ASCII, AMTOR/SITOR and TDM (Time Division Multiplex) signals, then measures signal speed and polarity. A simple "OK" command automatically switches the PK-232MBX to the recognized mode and starts the data display.

The 18K byte PakMail™ mailbox with selective control of third-party traffic is now a standard feature. Your friends can now leave you messages around the clock. PakMail uses a subset of the popular WØRLI/WA7MBL commands which includes List Mine, Kill mine, Read Mine, Edit, Help, etc. Your local full-service BBS can automatically forward and reverse-forward messages directly to and from your PK-232MBX. You can even use the PK-232MBX with the popular WØRLI and WA7MBL packet bulletin board programs.

Only AEA provides the type of full-featured Host Mode preferred by many professional programmers for efficient control of the PK-232MBX (see chart on page 11).

In packet, the PK-232MBX internal program is also compatible with the popular TCP/IP networking protocol. This requires the TNC to feature special commands, (KISS, PERSISTENCE, SLOTTIME) not found in all controllers.

Additional Features:

- **FAX Printing.** Many parallel printers can be connected directly to the PK-232MBX or to your computer (with appropriate applications software) to print HF monitored FAX signals.
- **Easy and Efficient Operation.** Twenty-one front panel indicators and a tuning indicator allow easy operation, with instant operating feedback for all modes!
- **Lithium Battery Backed RAM.**
- **Adjustable Threshold Control.**
- **Two Radio Ports.** Interchangeable HF or VHF operation. Front panel pushbutton selectable.
- **External Modem Disconnect.** Internal modem bypass for compatibility with higher speed modems.
- **Scope and FSK Outputs.** A separate accessory port gives both mark and space scope outputs and permits connection to your HF radio's FSK input.
- **Upgradeable.** The very first PK-232 is upgradeable to the latest version with plug-in ROMs and upgrade kits. 2400 Baud Option now available. Contact factory for further information.
- **Included.** The PK-232MBX comes with an RS-232 shielded cable, two radio cables and all rear panel mating connectors. The optional AC-4 Power Supply is available through AEA authorized dealers. Specific radio connectors need to be supplied by the user.

Specifications

Modem Input Dynamic Range: 5 mV to 500 mV RMS

Demodulator: 8-pole Chebyshev bandpass filter, limiter, 4-pole discriminator, 5-pole post-detection low pass filter

Modulator: Phase continuous sinewave, AFSK generator

Modulator Output Level: 5-200 mV RMS

Packet Protocol: AX.25 L2V2 (previous version supported)

Processor System: Zilog Z-80

RAM: Battery backed, 32 Kbytes

ROM: 64 Kbytes standard, 128 Kbytes maximum

Hardware HDLC: Zilog 8530 SCC

REAR PANEL INPUT/OUTPUT CONNECTIONS

Radio Interfaces: Two 5 pin, front panel selectable (receive audio, transmit audio, PTT, auxiliary squelch, ground)

External Modem: 5 pin: transmit data, receive data, carrier detect, ground, PTT

FSK Outputs: Normal and reverse

Scope Outputs: Mark, space

CW Keying Outputs: +100 VDC @ 200 mA max. and -25 V @ 30 mA max.

Terminal Interface: RS-232-C 25 pin DB-25 connector (pins 1-8 and 20, software and hardware handshake)

Terminal Data Rates: Autobaud settings at 300, 600, 1200, 2400, 4800 and 9600. TBAUD adds 45, 50, 57, 75, 100, 110, 150, 200, 400-BPS terminal rates

Printer Interface: Centronix parallel printer output with special cable (optional)

FRONT PANEL CONTROLS AND INDICATORS

Controls: Power, radio 1/2 selector, threshold adjust

Indicators: Data carrier detect LED, 10 segment HF bargraph tuning indicator, mode indicators (Baudot, ASCII, Packet, Morse, Sel FEC, FEC, ARQ, Mode L, AMTOR STBY), Status Indicators (STBY, Phase, Idle, Error, RQ, Tfc, Over, MULT, PTT, CONV, CMD, CON, Send, STA, TRANSPARENT)

PHYSICAL

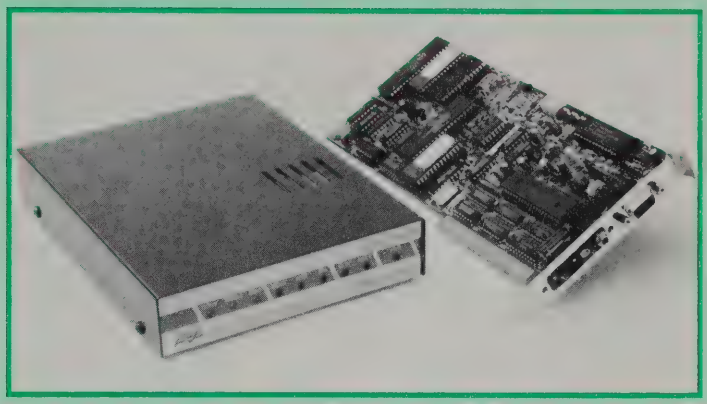
Power Requirement: +12 to +16 VDC @ 850 mA

Dimensions: 11"(279mm)W x 8.25"(210mm)D x 2.5"(64mm)H

Weight: 3 lbs.(1.35kg)

PK-88 / PCB-88

HF/VHF Packet TNCs



Unique operating features with a proven hardware and software design make AEA's PK-88 (desktop unit) and PCB-88 (plug-in card for your IBM PC or compatible) your best values in packet radio...now with MailDrop, an efficient 18K byte personal Mailbox with selectable third-party traffic. When your PK- or PCB-88 MailDrop is active, other stations can connect to you and exchange personal messages, traffic or bulletins. Your MailDrop also accepts inbound mail forwarding and supports reverse forwarding with your local WØRLI/WA7MBL/AA4RE/MSYS auto-forwarding packet BBSs. The internal lithium battery will hold the Maildrop contents should power be removed.

The PCB-88 differs from the PK-88 in that the PCB has a true DCD circuit built-in, as well as a standard modem disconnect header. Also, the PC-Pakratt-88 program is included with the PCB-88.

In addition to all the features of "standard" TNCs, the PK- and PCB-88 also offer these exceptional features:

- AEA's renowned Host Mode. Preferred by many programmers for efficient application programs.
- KISS command. Provides compatibility with KA9Q's "NET" TCP/IP protocol suite.
- "NET/ROM" compatibility. Turns your '88 into a Layer Three and Four networking node.*
- Unique WHYNOT command. Shows reasons why some received packets are not displayed.
- Packet Dump Suppression. Prevents dumping unsent packets on the radio channel if the link fails.
- Prioritized Acknowledgment (ACKPRIOR) protocol. Improves performance on busy packet channels.
- CUSTOM command. Allows limited customization for non-standard applications.
- Enhanced MBX command. Permits display of the data in I- and UI- frames, without showing packet headers and without retries.
- Unique MPROTO command. Controls display of non-ASCII packets from Layer Three switches and network nodes.
- Unique MFILTER value $80. Suppresses all graphics and control characters except TAB, CR and LF.
- Unique CFROM and DFROM commands. Permits selective connecting and digipeating ("Accept" or "Reject" digipeater operation by call signs).

*Available from Amatech International
6026 N. Greenwood, Clovis, CA 93612
209-299-8167

Specifications

MODEM

Modem Input Range: 5 to 770 mV RMS
Demodulator: AMD 7910 World Chip
Modulator: Phase-continuous sinewave, AFSK generator
Modulator Output Level: 5 to 300 mV RMS
Packet Protocol: AX.25 version 2.0 (version 1.0 supported)
Processor System: Zilog Z-80
RAM: Lithium battery backed, 32 KBytes
ROM: 32 KBytes
Hardware HDLC: Zilog 8530 SCC

REAR PANEL INPUT/OUTPUT CONNECTORS

Radio Interfaces: PK-88 uses locking 8-pin, PCB-88 uses DB-9 (receive audio, transmit audio, PTT, auxiliary squelch, ground);
External Modem (PK-88): Transmit data, receive data, data carrier detect, clock, ground (PCB-88 uses TAPR's Modem Disconnect header)
Terminal Interface: RS-232-C 25-pin DB-25 connector (PK-88)
Terminal Data Rates: Single character auto-baud detection at 300, 600, 1200, 2400, 4800, 9600 and 19200. TBAUD adds 45, 50, 57, 75, 100, 110, 150, 200 and 400 BPS terminal rates.

FRONT PANEL INDICATORS

PK-88 Indicators: Converse, transparent, command, send, data carrier detect, status, connect, multiple connect, power

PHYSICAL

Power Requirement: +12 to +16 VDC @ 550 mA
PK-88 Dimensions: 7.5"(191mm)W x 6"(152mm)D x 1.5"(38mm)H PK-88 weight: 2.4 lbs.(1.1kg)

Software

Software Selection Table for PK-88 and PK-232MBX

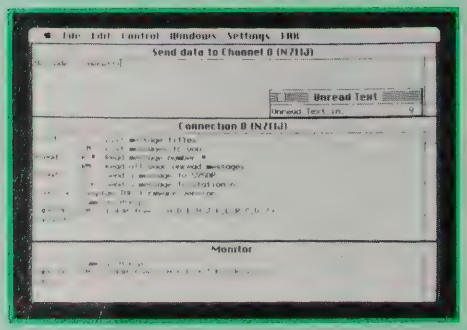
PC	Software	Dat a	FAX	Split Screen	Memories	Host Mode	Printer	Disk	Media	PK-88
IBM	PC-Pakratt II/FAX	yes	yes	yes	yes	yes	yes	yes	D	no
IBM	PC-Pakratt-88	yes	no	yes	yes	yes	yes	yes	D	yes
IBM	PC-Pakratt/Windows	yes	yes	yes	yes	yes	yes	yes	D	yes
C-64	Com-Pakratt/FAX	yes	yes	yes	yes	yes	yes	yes	R*	yes
Mac	MacRatt	yes	yes	yes	yes	yes	yes	yes	D	yes

Key: D=Disk, R=Rom (*C-64 programs are in ROM only but support a disk drive.)

MacRATT with FAX

AEA's MacRATT with FAX version 2.1computer program for the Apple Macintosh makes using AEA's PK-232MBX multi-mode and PK-88 packet controllers easier than ever. Every powerful feature of the PK-232MBX and PK-88 is now as easy to use as pointing with a mouse.

If you are familiar with basic Macintosh operating procedures, you'll find MacRATT very easy to use.



Features:

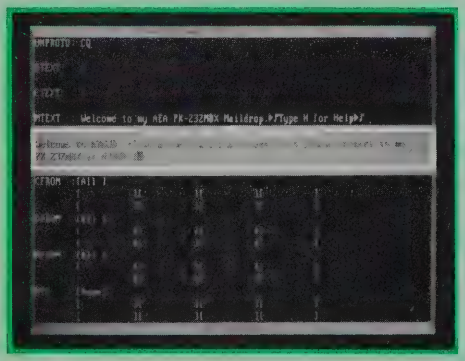
- Includes cable for Mac Plus and newer models using mini-8 DIN connector
- Now with QuickRead feature for efficient PBBS operations
- Full support for the latest PK-232/PK-88 command set
- Windows for entering text, displaying the receive buffer and logging transmitted text. All windows employ standard Mac features such as scrolling and copying to the clipboard
- Window display of the status of file transfers and the link between the TNC and the Mac
- FAX is an integral part of the program, and FAX images can be sent to the printer without changing cables
- MacRATT runs the PK-232MBX or PK-88 in Host Mode for fast, efficient operation, and will run under MultiFinder
- Text uploading, downloading and printing are easy. "Unlimited" macro keys can be used to speed text entry
- Character-at-a-time sending for RTTY, AMTOR and CW
- Extended keyboard support
- Works with the Macintosh 512K Enhanced, Plus, SE, II series, and Mac Classic

PC Pakratt II w/FAX

For the IBM-PC or compatible computers and PK-232MBX, AEA offers PC Pakratt and PK FAX as a set, complete with 5-1/4" and 3-1/2" media.

PC Pakratt II

The PC Pakratt program is a split-screen terminal program for operation of Morse code, Baudot, ASCII, AMTOR and Packet.



Features include:

- Friendly on-screen Help menu at the touch of a key to define commands and parameters for all modes
- Mouse support
- DOS gateway
- Full QSO logging feature
- Fast Initialization cuts startup time down to a few seconds
- Complete macro key facility
- Supports COM 1 – 4
- Can save PakMail messages to disk
- Up to 900 line scroll-back buffer to store incoming data
- Quick access to your favorate word processor or text editor for editing message files
- Five message/command buffers so you can pre-program messages or commands for transmission with a single keystroke
- Complete parameter screen
- Requires 512K RAM minimum and DOS version 3.0 or higher

PK FAX

The PK FAX program enables you to display, store and transmit facsimile signals on-screen. Features include:

- All standard HF radio facsimile formats can be displayed on-screen
- Received signals can be stored to either floppy or hard disk automatically
- Supports COM 1 – 4
- Converts received signal files to Paintbrush compatible format
- Transmits files, including Paintbrush files, in the FAX mode
- Prints received files with most printers capable of dot matrix graphics
- Enlarges any one-quarter screen to four times normal size for closer inspection
- Compatible with CGA, EGA and Hercules compatible graphics adapter cards. No hardware or software changes are necessary to any FAX compatible PK-232MBX.
- Requires 384K internal computer memory. Two disk drives or a hard disk are recommended.

Software

PC-Pakratt-88

The PC-Pakratt-88 program is a lower-cost packet-only version of the PC-Pakratt II program for the PK-88. Most features of PC-Pakratt II are included, but RTTY, FAX, AMTOR, etc., support has been removed as the PK-88 is a Packet only TNT.

Features:

- Friendly on-screen Help menu at the touch of a key
- Mouse support
- DOS gateway
- Fast Initialization cuts startup time down to a few seconds
- Complete macro key facility
- Supports COM 1 – 4
- Can save PakMail messages to disk
- Up to 900 line scroll-back buffer to store incoming data
- Quick access to your favorate word processor or text editor for editing message files
- Five message/command buffers so you can pre-program messages or commands for transmission with a single keystroke
- Complete parameter screen
- Requires 512K RAM minimum and DOS version 3.0 or higher

Com Pakratt with FAX

AEA's Com Pakratt and Com FAX programs for the Commodore 64 computer supports the PK-232MBX data controller. The set is supplied on two ROM plug-in cartridges and includes an RS-232 level converter.

Com Pakratt

The Com Pakratt program is a split-screen terminal program enabling full operation of Morse code, Baudot, ASCII, AMTOR and Packet modes in the PK-232/MBX.

- Most common commands are programmed for direct function key operation
- Incoming data is automatically routed into a QSO buffer capable of holding up to 13K
- Easy-to-use ROM cartridge means disk or cassette drive is not needed
- Select background, text, highlight and echo colors on a color monitor
- Six preset and four programmable memories for CQ, QBF, RY, Time, Call Sign and SELCAL
- Support disk directory, text file transfers and storage of received data
- Supports printer output for Morse code, Baudot, ASCII, AMTOR and Packet to Commodore printers directly from the computer

Com FAX

The Com FAX program enables you to display, store and transmit facsimile signals. Features include:

- All standard HF radio facsimile formats can be displayed
- Most common commands are programmed for direct function key operation
- Supports printer output to VIC 1525 or MPS 801 compatible printers
- Enlarges any one-quarter screen to four times normal size for closer inspection
- Supports disk directory, load/save FAX buffer and disk commands
- Transmits files directly from the FAX buffer

We feel our support software is the best available, bar none. This is how our customers often respond when asked what aided them in making their buying decision:

"Host Mode makes operation easier." L.L., Northvale, N.J.

"...more user friendly...works better than other kinds..." P.C., Yakima, WA

"My regular comm. program didn't give me the control I wanted." J.L., Irvine, CA

"(Competitor's product) would not work." A.S., Leasburg, MO

"AEA seems to be the leader in TNCs." J.G., Wyandotte, MI

"Features, Quality, Commitment to digital communications by AEA." S.S., Lancaster, OH

"Word-of-mouth & other AEA products I've owned." S.Z. Sioux City, IA

"Bought another brand which promised a lot but was a big let-down. This product does what it promotes." L.G., Ft. Benton, MT

"It 'goes' with the PK-88 – However, I bought the PK-88 because of the software!" P.M., Fairfield, CT

"I love your good customer support both at AEA & on CompuServe. Thanks a lot!" C.C., Brooklyn, NY

"Well-written manual for fast start-up for new user." C.S., Jaffrey, NH

"Numerous features, ease of operation. Very pleased!" J.R. Somerset, PA

"Word of mouth that it was the best, and had best customer support." L.E., Poulsbo, WA

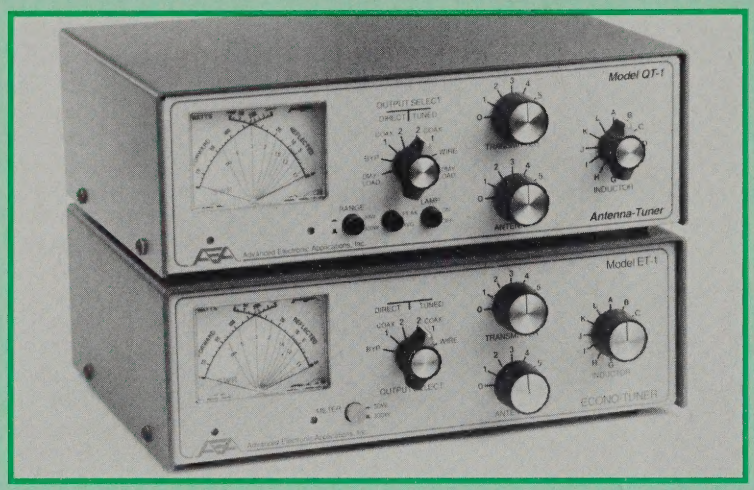
"Second one I have purchased. In my opinion easiest program for ease of operation there is." E.D., Butte, MT

"Product features and company reputation for quality." J.J., NY, NY

"AEA is the best." O.J., San Francisco, CA

All in all, AEA provides unrivaled software support for the PK-232 and PK-88 data controllers. Don't settle for anything less than the best!

RF Products



QT-1 and ET-1 Antenna Tuners

Meet your match with AEA's QT-1 and ET-1 Antenna Tuners. High-quality construction, low cost and excellent value set these tuners apart from the competition.

A good quality, economical antenna tuner for under $130, the ET-1 is designed to match virtually any receiver, transmitter or transceiver from 1.8 to 30 MHz with up to 300 watts of RF power.

The QT-1 has the same features as the ET-1, plus a built-in dummy load, a peak or average reading meter, and a meter light.

Versatile. The QT-1 and ET-1 are compatible with almost ANY real antenna including verticals, dipoles, inverted vees, beams and mobile whips that are fed by coax cable, balanced lines or a single wire. For easy connection to balanced lines, a 1:4 balun is built-in.

Tuning Options. Both tuners feature front panel switch control which allows you to alternate between two coax-fed antennas (direct or through the tuner). You can also switch to a balanced line or wire antenna. The BYPASS position allows you to switch to a directly-connected coax antenna. In the DIRECT positions, COAX 1 OUT or COAX 2 OUT, the tuner is bypassed, but the SWR/Power meter remains active.

The QT-1 also has switch positions for the dummy load (tuned or direct).

Dual-Movement Meter. The QT-1 and ET-1 both feature a precision dual- movement meter to simultaneously monitor power and SWR.

AEA Quality. Unique engineering designs have made AEA one of the leading innovators in the amateur radio industry. That same quality and superior technical support make the ET-1 your best deal for an antenna tuner. Like other AEA products, the ET-1 cabinet is chemically treated so the paint will not scratch or chip off with your fingernail during normal operation.

Specifications (Typical)

RF Power: 3.5 to 30 MHz, continuous 300 watts; 150 W on 1.8 MHz

Frequency Range: 1.8 to 30 MHz

Transmitter/Antenna Tuning: Continuous rotation capacitors

Reactance: 12-position switched inductor

Antenna Selector: Six positions: COAX 1 tuned and DIRECT, COAX 2 tuned and DIRECT, bypass and balanced antenna

Power Switch: High and low (300W/30W)

Dimensions: 10.2"(259mm)W x 9.4"(239mm)D x 3.5"(89mm)H

Weight: 3.4 lbs.(1.5kg)

WM-30 HF SWR/Power Meter

Another high-quality RF product from AEA, the WM-30 measures and displays forward power, reflected power and SWR simultaneously on its dual movement meter system.

Accuracy of the readings is assured as the WM-30 features a true shielded directional coupler. The backlit meter can display either peak or average power readings, and has 300 and 3000 watt range settings.

The frequency range is 1.8 to 30 MHz. The unit measures 5.3"W x 5.75"D x 3.5"H and weighs 1.2 lbs.

Like other AEA RF products, the WM-30 case is chemically treated for scratch and chip resistance to keep it looking new longer.

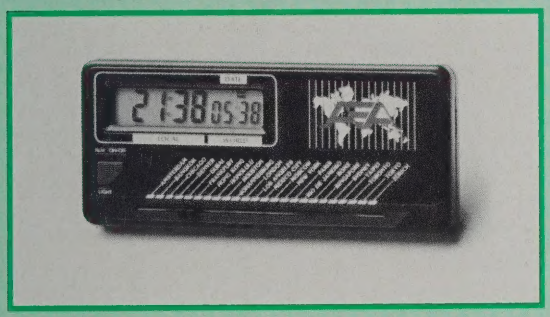
Accessories

AC-1/AC-4 Power Adapters

AEA's 12 VDC wall adapters, the AC-1 and AC-4 are suitable power supplies for all AEA products requiring 12 VDC at 600 mA/1000 mA or less current. The AC-4 provides one amp of output and is ideal for use with the PK-232MBX, DSP-1232 and DSP-2232.

DC-1 Cigarette Lighter Cord

The DC-1 is a fused cable with a standard cigarette lighter plug for 12V operation.



World Clock

AEA's world clock features dual digital displays so you can see the local time and any of 24 selected time zones side-by-side. Move the slide bar to select the city/zone you want, and the display automatically changes to the proper time and date. The world clock also features an alarm, light button and compact size. Perfect for the home station or for traveling. A folding easel stand and a travel pouch are included.

Technical Support Makes The Difference!

Over the years, AEA has provided its customers with unsurpassed customer service and technical support. Here at AEA we make customer service our number one priority. This is why our customers are our best salespeople. Just ask around and you'll hear comments like these:

"It surely does make a difference that someone takes the time and patience to assist in these matters. {Your representative} was pleasant and tactful in his dealing with this problem and it is refreshing to witness this attitude in the Service Department of an organization like yours." J.B., St. John's, Newfoundland

"I would like to thank you for having one of the best service departments in the amateur radio industry. Thank you again for the swift repair work." S.T., Athens, TX

"I want to start by saying how pleased I am with both your product (PK-232) and with the customer service I have received...Keep up the good work, and thanks again for the products, support and especially service." S.L., Lakewood, CO

"I am glad to find that AEA puts as much care into their customer support as they do into their product design. I will quickly recommend AEA to my ham friends." P.T., Annapolis, MD

"...when I had a problem, even though the unit was out of warranty you fixed it with minimum of fuss...I recommend your products highly because of your support." C.C., Redford, MI

"Great customer service. Always cheerful & pleasant when I call for 'help'." C.S., Aloha, OR

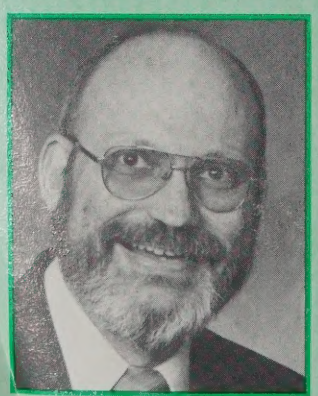
"I would like to thank you and your technical support department on your assistance...Thank you for your kind assistance and keep up the good work...your personal touch with customers is what keeps bringing them back." B.H., Miami, FL

Advanced Electronic Applications, Inc.
2006-196th St. SW/P.O. Box C2160
Lynnwood, WA 98036
(206)775-7373

BULK RATE
U.S. POSTAGE
PAID
Lynnwood, Wa
Permit No. 48

Co-Founder ....Silent Key

It is with sadness I report to our AEA customers the passing of my co-founding partner George Buxton, N7EZJ on December 30, 1990.



George and I first became acquainted while working at John Fluke Manufacturing Company back in the early 1970's. We each went our own way and started independent companies after Fluke.

In 1977 we got together again and formed AEA as equal shareholders. George, having an MBA in addition to a BSEE took responsibility for fiscal management of our new venture while I took primary responsibility for Marketing and the technical side of the business. Together, we shared operations and corporate management responsibility.

George and I had a very fortunate relationship based on mutual respect and a close personal friendship.

We both believed strongly in offering our customers products based on sound engineering principles with a motto shared often with our associates: "Under-Sell, Over-Deliver!" George's business ethics were of the highest caliber and he was instrumental in helping establish AEA's reputation for fairness in all its dealings with customers and suppliers. While George will be missed dearly by all his associates here at AEA, his philosophies will live on.

Sincerely

Mike Lamb

C.Mike Lamb N7ML

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